REMARKS

Status of the Claims

Claims 1-18, 20, 21, 23-31, and 33-52 are pending in the present application, Claims 19, 22, and 32 having been canceled in the present amendment, and new Claims 41-52 having been added in the present amendment. Claims 3-7, 9-12, 13, 16, 18, 23, 24, 27-30, 33, and 36-40 have been amended to more clearly define the invention. Claim 40 has been further amended to correct a typographical error. Claims 9-11 and 18 have been amended to place them in better form for a dependent claim.

Claim Objection

The Examiner has objected to Claim 40, because Claim 34 was inadvertently added to the end of Claim 40. Appropriate correction has been made, and the objection should be withdrawn.

Claims Rejected under 35 U.S.C § 102

The Examiner has rejected Claims 1-5, 8-9, 11-14, 17-18, 20-22, 25-26, 29-30, 32-33, 35-37, and 38-39 as being anticipated (i.e., as being identical to) a network of air samplers disclosed by U.S. Patent No. 7,096,125 (Padmanabhan). Padmanabhan discloses a sensor network configured to process data received from a plurality of distributed sensors using an information fusion method (i.e., a Bayesian net) in order to reduce false alarms and enhance the detection of threats. The Examiner asserts that Padmanabhan discloses an equivalent device. Applicant disagrees for the following reasons.

One key distinguishing element in applicant's claim recitation is the "*regenerative surface air sampler.*" Such an element is described in the specification and is shown in FIGURE 2 of the pending application. Significantly, the regenerative collection surface enables the air sampler to be operated for long periods without requiring replacement of any consumable components (such as a collection surface). The regenerative surface sampler collects particles from air and concentrates the particles in a spot on the regenerative collection surface. The spot is analyzed (for example, by UV fluorescence in one exemplary embodiment) to detect the presence of biological particles. The sampler is equipped with a communications interface to enable a signal (such as an alarm indicating the presence of potentially dangerous biological particles) to be transmitted to a remote receiver/controller. Once a spot of particles has been analyzed, the regenerative collection surface is regenerated (i.e., previously collected particles are removed to enable a fresh spot of particles to be

collected, without contamination by the previously collected particles) and additional particles are collected.

Significantly, there is no basis for concluding that any of the sensors disclosed by Padmanabhan include an equivalent regenerative collection surface. Padmanabhan discloses sensors configured to detect particles in air (i.e., particles that have not been deposited on a collection surface, but are analyzed *in situ*, such as using LIDAR), sensors configured to detect particles deposited on a collection surface (such as a mass spectrometer (MS)) using a tape as a collection surface; see column 10, lines 38-54), and sensors configured to detect particles in a liquid sample (nucleic acid (PCR)- and antibody (AB)-based sensors). None of the sensors disclosed by Padmanabhan includes applicant's recited regenerable collection surface.

Applicant's inclusion of a regenerable collection surface provides a substantial benefit that is not achieved by the cited reference. Padmanabhan recognizes that sensors requiring consumables have a limited operation life. Padmanabhan address this issue by continuously operating non-consumable-based sensors (such as LIDAR), and operating the consumable-based sensors (MS, PCR, and AB) sensors only after the other non-consumable-based sensors are triggered, to reduce the amount of consumables required (see column 3, lines 62-65; and, column 6, lines 11-14). In contrast, applicant has claimed a sensor (including an interface capable of communicating with a network) that includes a regenerable collection surface, eliminating the need for replenishing consumables, as is required by the surface-based sensor disclosed in Padmanabhan (e.g., the tape-based MS sensor). At some point, Padmanabhan's MS sensor will require replacement of the tape, whereas applicant's sensor can operate without replacing a consumable. An example of a tape-based sensor can be found in FIGURE 5 of U.S. Patent No 6,363,800. Such tapes enable operation for as long as the tape lasts, but at some point, the entire roll of tape is exhausted, and a new roll of tape must be employed. Clearly, a replaceable tape is not equivalent to a regenerable collection surface, but instead, is a replaceable surface. The two are not the same in function or operation. By employing a regenerable collection surface (as recited in his claims), applicant is able to employ a relatively sophisticated detector requiring a solid sample deposited on a substrate in a continuous sampler, whereas Padmanabhan is only able to use less specific detectors (such as LIDAR or particle counters) as continuous air samplers.

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The element of a *regenerable surface based air sampler* is recited in independent Claims 1, 13, 14, 20, 26, 32, and 35, and since this element is not taught or suggested by the prior art, each of these claims is clearly patentable. While the cited art teaches a variety of different sensors, there is no teaching or suggestion in the cited art of any air sampler based on a regenerable collection surface (i.e., than includes a regenerable collection surface). It is well accepted that dependent claims are patentable for at least the same reasons as the independent claims from which they depend. Accordingly, the rejection of Claims 1-5, 8-9, 11-14, 17-18, 20-22, 25-26, 29-30, 32-33, 35-37, and 38-39 as being anticipated by U.S. Patent No. 7,096,125 (Padmanabhan) should be withdrawn.

As amended, dependent Claims 4, 16, 23, 28, 33, and 37 further generally recite that the sensor includes: *a regenerable collection surface configured to collect particles from the air; and a surface regenerator configured to remove particles from the regenerable collection surface, such that once regenerated, the regenerable collection surface can collect additional particles from the air, and such that particles collected before regeneration of the regenerable collection surface are substantially no longer present to contaminate particles collected after the regeneration of the regenerable collection surface.* The cited art does not teach or suggest an equivalent *surface regenerator.*

As amended dependent Claim 6 further recites that the sensor comprises "*a spotting nozzle configured to direct an air stream towards the regenerable collection surface, such that the resulting impact of the air stream with the regenerable collection surface generates a spot of particles on the regenerable collection surface.*" The cited art does not teach or suggest such a concentrated spot.

As amended dependent Claims 7, 12, 24, and 29 recite specific structures for regenerating a collection surface, none of which are taught or suggested by the cited art.

As amended dependent Claim 30 recites a homing element, which is not taught or suggest in the cited art.

Claims Rejected under 35 U.S.C § 103

The Examiner has rejected Claims 6-7, 10, 15-16, 19, 23-24, 27-28, 31, and 40 under 35 U.S.C § 103(a) as being obvious over Pandmanabhan and Official Notice. Applicant disagrees for the following reasons.

As noted above, each independent claim recites the element of a regenerative surface based air sampler, and the cited art does not teach or suggest an equivalent element. Because dependent claims are patentable for at least the same reasons as the independent claims from which they depend, each of these dependent claims is also patentable due to the recitation of a regenerative collection surface in the air sampler. Accordingly, the rejection of Claims 6-7, 10, 15-16, 19, 23-24, 27-28, 31, and 40 under 35 U.S.C § 103(a) as being obvious over Pandmanabhan and Official Notice should be withdrawn.

As amended, dependent Claim 6 further recites that the sensor comprises "*a spotting nozzle configured to direct an air stream towards the regenerable collection surface, such that the resulting impact of the air stream with the regenerable collection surface generates a spot of particles on the regenerable collection surface.*" The cited art does not teach or suggest such a concentrated spot or any equivalent. Because amended dependent Claims 7, 12, and 24 recite specific structures for regenerating a collection surface, none of which are taught or suggested by the cited art, these claims are clearly patentable, and their rejection should be withdrawn.

With respect to Claim 10, the Examiner asserts that airplanes have air circulation systems so similar to an air circulation system in buildings that it would have been obvious to introduce a system designed for air sampling in a building into an airplane. Applicant respectfully submits that the cited art does not teach or suggest the modifications that would be necessary to implement such a feat, and therefore, it must be concluded that the rejection of Claim 10 impermissibly relies upon hindsight and should be withdrawn.

As amended, dependent Claims 16 and 23 generally further define the sensor as comprising *a regenerable collection surface configured to collect particles from the air;* and recite *a surface regenerator configured to remove particles from the regenerable collection surface, such that once regenerated, the regenerable collection surface can collect additional particles from the air, and such that such that particles collected before regeneration of the regenerable collection surface are substantially no longer present on the regenerable collection surface to contaminate particles collected after the regenerable collection surface is regenerated.* The cited art does not teach or suggest an equivalent *surface regenerator.*

With respect to Claim 40, the Examiner asserts that it would have been obvious to modify Padmanabhan's network to transmit an alert to a fire department or law enforcement agency (i.e., an agency that was not onsite at the building being protected). Applicant respectfully submits that the cited

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art does not teach or suggest such a functionality, and as such, the rejection of Claim 40 impermissibly relies upon hindsight and should therefore be withdrawn.

Patentability of Newly Added Claims

Applicants have added new Claims 41-51 in the present amendment, each of which are fully supported by applicants' disclosure in the specification.

New Claim 41 depends from Claim 4 and introduces a particle concentrator and size-selective inlet to enable the air sampler to be configured to detect low levels of particles having a well-defined size. The cited art does not teach or suggest incorporating such elements into an air sampler including a regenerable collection surface and a communications interface.

New Claim 42 also depends from Claim 4 and introduces a mechanically-based homing sensor that positions the regenerable collection surface relative to a specific component. The cited art does not teach or suggest an equivalent homing sensor.

New Claim 43 depends from Claim 4 and introduces the elements of an analyzer and processor to enable the air sampler to be configured to identify potentially dangerous particles and transmit an alert signal. The cited art does not teach or suggest incorporating such elements into an air sampler including a regenerable collection surface and a communications interface.

New Claim 44 generally corresponds to rewriting Claim 4 in independent form and is patentable for substantially the same reasons that distinguish Claim 4 over the cited art, as discussed above.

New Claim 45 defines a method for continuously monitoring airborne particles, the method repetitively carrying out a plurality of cycles, the method steps including depositing particles that were airborne on a regenerable collection surface, analyzing the particles that were deposited on the regenerable collection surface, transmitting a signal indicative of the results over a network (when the analysis indicates the particles represent a potential threat), and regenerating the regenerable collection surface to substantially remove the particles that were previously deposited thereon during a previous cycle. The cited art does not teach or suggest monitoring air quality using a regenerable surface air sampler.

New Claim 46 depends on new Claim 45, and further recites that the particles are deposited on the regenerable collection surface form a spot of concentrated particles, a step not taught or suggested by the cited art.

New Claim 47 depends on new Claim 45, and further recites specific steps for regenerating the collection surface, which are not taught or suggested by the cited art.

New Claim 48 depends on new Claim 45, and further recites the step of verifying that regenerating the regenerable collection surface has substantially removed the particles that were previously deposited. The cited art does not teach or suggest an equivalent step.

New Claim 49 depends on new Claim 48, and further recites that when the particles are analyzed using fluorescent techniques, the step of verifying whether the surface is regenerated is based on comparing background fluorescent levels with post regeneration fluorescent levels. The cited art does not teach or suggest using equivalent techniques to verify that a regenerable collection has been sufficiently regenerated.

New Claim 50 depends on new Claim 45, and further recites specific steps for analyzing the collected particles. The cited art does not teach or suggest using equivalent analytical techniques with a regenerable collection surface.

New Claim 51 depends on new Claim 45, and further recites coupling a plurality of sensors together to form a network. The cited art does not teach or suggest a sensor network including a plurality of regenerative surface based air samplers.

New Claim 52 depends on new Claim 45, and further defines types of signals that can be transmitted. The cited art does not teach or suggest a regenerative surface air sampler configured to transmit a signal.

Accordingly, all of the claims now submitted define patentable subject matter that is neither anticipated nor obvious in view of the prior art cited. The Examiner is thus requested to pass the present patent application to issue in view of the amendments and the remarks submitted above. If there are any questions that might be addressed by a telephone interview, the Examiner is invited to telephone the undersigned attorney, at the number listed below.

Respectfully submitted,

/mike king/
Michael C. King
Registration No. 44,832

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